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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SELLERS, DANIEL R

ART UNIT

PAPER NUMBER

2644

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/537,948	Applicant(s) JOHNSTON ET AL.	
	Examiner Daniel R. Sellers	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 5, 7, 10, 11, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of admitted prior art, Grill, and Laurent, U.S. Patent No. 5,522,099.

3. Regarding claim 1, see Grill

*A method of deploying filters for use in processing audio signals, comprising:
calculating a filter for each of a plurality of frequency bands; (Col. 4, lines 20-35).
determining a distance between coefficients of filters in adjacent frequency bands;
and merging filters with a shortest distance between coefficients.*

Grill teaches a frequency-domain coding apparatus and method. They teach the use of filter banks for use in a high sampling frequency coder. Grill does not teach the steps of determining a distance between coefficients, nor do they teach the merging of filters.

Laurent teaches a method of combining predictor filters, and reducing the number of filters employed by merging (Col. 5, lines 5-25). Laurent teaches the determination of distance between filters, and the merging of filters with the shortest distance, wherein the aim is to minimize the total error created by using a merged filter. Laurent teaches separate filters per frame for use in a voice coding system, however one skilled in the art can appreciate that this method can be used in any system that aims to reduce the number of filters used in the system. It would have been obvious for one of ordinary

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skill in the art to combine the teachings of Grill and Laurent for the purpose of obtaining the best results with a limited amount of filters. The applicant discloses that the AAC standard limits the number of TNS filters per block.

4. Regarding claim 2, the further limitation of claim 1, see the preceding argument with respect to claim 1. The applicant discloses, in the background, that the AAC standard utilizes TNS filters.

5. Regarding claim 4, the further limitation of claim 1, see the preceding argument regarding claim 1.

... wherein said merging involves calculating a new filter for a frequency range consisting of said adjacent frequency bands of said filters with said shortest distance.

Laurent teaches that a new filter is calculated to replace the other filters with the shortest distance between coefficients.

6. Regarding claim 5, see the preceding argument with regard to claim 1.

A method of deploying filters for use in processing audio signals, comprising:

- a) calculating a filter for each of a plurality of frequency bands,*
- b) comparing coefficients of filters in adjacent frequency bands to identify a pair of filters with a shortest Euclidean distance between coefficients;*
- c) merging said pair of filters;*
- d) repeating steps a) through c) until a predetermined number of total filters is reached.*

The combination of Grill and Laurent teach these features.

7. Regarding claim 7, the further limitation of claim 5, see the preceding argument of claims 1, 4, and 5. The combination of Grill and Laurent teach the calculation of a merged filter's coefficients.

8. Regarding claim 10, see the preceding argument with respect to claim 1, and further

*A method of deploying a filter for use in processing audio signals comprising:
determining a first filter for a first frequency range;*

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determining a second filter for a second frequency range, said second frequency range involving said first frequency range;
calculating a first Euclidean distance using coefficients of said first filter;
calculating a second Euclidean distance between coefficients of said first filter and coefficients of said second filter;
calculating a first prediction gain using said first filter;
calculating a second prediction gain between said first filter and said second filter; and
if said second Euclidean distance is greater than said first Euclidean distance and said second prediction gain is less than said first prediction gain, then deploying said first filter for said first frequency range.

It is inherent that there is some overlap in a filter bank as taught by Grill. Laurent teaches the method of calculating a Euclidean distance between filters and calculating a prediction gain, or an error signal (Col. 5, line 26 – Col. 6, line 17). Laurent teaches that the best filter to deploy, is the filter with the least error, or largest prediction gain.

9. Regarding claim 11, the further limitation of claim 10, see the preceding argument with respect to claim 2. The combination teaches the use of TNS filters.

10. Regarding new claim 13, the further limitation of claim 10, see Laurent, figure 3. Laurent teaches the use of the same filter for frames 1 and 2. Laurent illustrates that frames 1 and 2, 4, and 6 use three different filters, wherein the frames 3 and 5 use interpolated filters. Laurent further teaches that filters' distances are calculated for all combinations, and the filters that minimize error are utilized, therefore it is obvious that the combination of Grill and Laurent recalculates filters until a predetermined amount of filters is reached in the merging process.

11. Regarding new claim 15, see the preceding argument with respect to claim 1. The combination of Grill and Laurent teach this. It is inherent that filters in a filter bank overlap, because in practice perfect filters with abrupt cutoff frequencies cannot be realized.

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12. Claim 3, 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grill and Laurent as applied to claim 1 above, and further in view of Damoulakis et al. (Damoulakis), U.S. Patent No. 4,720,802.

13. Regarding claim 3, the further limitation of claim 1, see Damoulakis
... wherein said coefficients are PARCOR coefficients. (Col. 4, line 62 - Col. 5, line 4).

Damoulakis teaches a noise compensator in a speech coder, which employs the use of partial correlation (PARCOR) coefficients. Damoulakis further teaches that filter banks could be employed in a frequency analysis situation, however they do not teach the steps of determining distance and merging as claimed in the parent claim. The combination of Grill and Laurent teach the features of claim 1. It would have been obvious for one of ordinary skill in the art to combine the teachings of Damoulakis with the combination of Grill and Laurent for the purpose of more efficient coding.

14. Regarding claim 6, the further limitation of claim 5, see the preceding argument with regards to claims 1, 3, and 5. The combination of Grill, Laurent, and Damoulakis teach the features of claim 6.

15. Regarding claim 12, the further limitation of claim 10, see the preceding arguments with regard to claims 1, 3, and 10.

... wherein said coefficients are PARCOR coefficients.

Damoulakis teaches the use of PARCOR coefficients.

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16. Claim 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grill and Laurent as applied to claim 5 above, and further in view of Streb, U.S. Patent No. 3,568,144.

17. Regarding claim 8, the further limitation of claim 5, see Streb

... further comprising:

*after said predetermined number of filters is reached, recalculating at least one of said filters using only those frequencies corresponding to a strongest signal within a frequency range covered by said at least one of said filters; and (Col. 2, lines 20-25).
using said recalculated filter for an entire extent of said frequency range.*

In an analogous art, Streb teaches a sound viewer apparatus utilizing a bank of filters.

The filters are calculated individually for a signal signature in the band of frequencies each filter covers. The bandpass region of these filters corresponds to the strongest signal of interest in the bandpass region. Streb does not teach the features of determining a distance between filter coefficients, nor does She teach the step of merging filters. The combination of Grill and Laurent teach these features. It would have been obvious for one of ordinary skill in the art to combine the teachings of Streb with the combination of Grill and Laurent for the purpose of improving the perceived quality of the coder.

18. Regarding claim 9, the further limitation of claim 8, see the preceding argument of claim 8, and

... wherein said strongest signal is identified based on energy/bin within said frequency range.

It is obvious to one skilled in the art that the strongest signal is identified in the frequency domain based on energy per frequency bin.

Allowable Subject Matter

19. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

20. The following is a statement of reasons for the indication of allowable subject matter: Claim 14 recites:

“clustering the filters... and using a centroid of each... group as a final filter....”

The prior art of record does not teach grouping the filters or using a centroid as a final filter.

Response to Arguments

21. Applicant's arguments, see pages 6-10, filed May 23, 2005, with respect to the rejection(s) of claim(s) 1-12 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Laurent.

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Malvar, U.S. Patent No. 6,115,689.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel R. Sellers whose telephone number is 571-272-7528. The examiner can normally be reached on Monday to Friday, 9am to 5:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DRS


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